

Academy of Model Aeronautics

NEWCOMERS' GUIDE

Bringing Modelers Together

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Academy of Model Aeronautics

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www.modelaircraft.org

TIPS FOR NEWCOMERS



The most popular questions visitors to RC flying fields ask:

How much does it cost? It is easy to get started in the sport for less than \$400, including everything.

How far away can the model fly? The control system can operate the model even beyond visual range. But if the model is so far away that it cannot be seen, it is impossible for the pilot to fly it. Our usual maximum distance is one-third of a mile.

Can this model carry pyrotechnics? Emphatically, no it cannot! The model's carrying ability is limited to a pound or so, and that weight is dedicated to the power and guidance equipment. Since those components are needed for control, the model really can't carry anything extra.

And the Dreaded Question: How often do you crash? Modern radio-control systems are so reliable and model engines (and electric motors) are so easy to operate that crashes seldom occur. Even if the model is completely destroyed, the engine and radio system (the expensive parts) usually survive to be installed in another model.

Welcome to the exciting world of aeromodeling. Maybe you are looking for a hobby that you and your children can enjoy together. Or maybe you are looking for something you can enjoy doing with your parents. No matter the reason, you have chosen a sport that can easily cater to any goal you might set for yourself.

You can get started with either an airplane or a helicopter trainer, fly at a state-of-the-art flying facility such as one the Academy of Model Aeronautics (AMA) maintains, or simply take to the skies at an appropriate field anywhere that's convenient.

Our best advice is to not go at this alone. Not only is the AMA here to help, but there is nothing a dedicated RC pilot likes better than to provide valuable information to a new enthusiast. Also try to get additional information from magazines, other fliers, model discussion Web sites, and other information sources.

How to Get Started

The sport of RC is open to nearly anyone. You do need to be able to see at least 20/30 with correction. The same hand/eye coordination skills needed to drive a car can make you a super RC pilot.

You don't have to have special technical knowledge either. You do not need to know anything about electronics nor do you need any idea about how to build a model engine. In today's modeling world, you don't even need to know how to build a model aircraft. The RC industry has done all that work for you.

Our first recommendation is to read through Sport Aviator online magazine. (See the online resources page.) Since Sport Aviator is dedicated to new model pilots, there is a lot of information that can save hundreds of dollars and hours of frustration. Sport Aviator is provided free as a service of the AMA.

The next thing you need to do

is join the AMA for several good reasons. One is the information about the world of model aviation and the in-depth technical information contained in *Model Aviation* magazine. Another good reason is the \$2 million liability insurance coverage provided. Just about every model airport in this country requires this insurance.

Find an RC model airfield and visit it on a Saturday or Sunday between 11 a.m. and 2 p.m. The largest number of pilots will be there during this time, including instructors.

If you do not know where an RC field is located in your area, find a retail hobby store near you (one that specifically mentions RC model aircraft). It is usually best to visit the store and ask where a club field is located.

While you are at the store, look at some of the trainer aircraft in stock, both Ready-to-Fly (RTF) and Almost Ready-to-Fly (ARF). But don't buy anything just yet. That comes later, after you have visited the field and talked to a few pilots there.

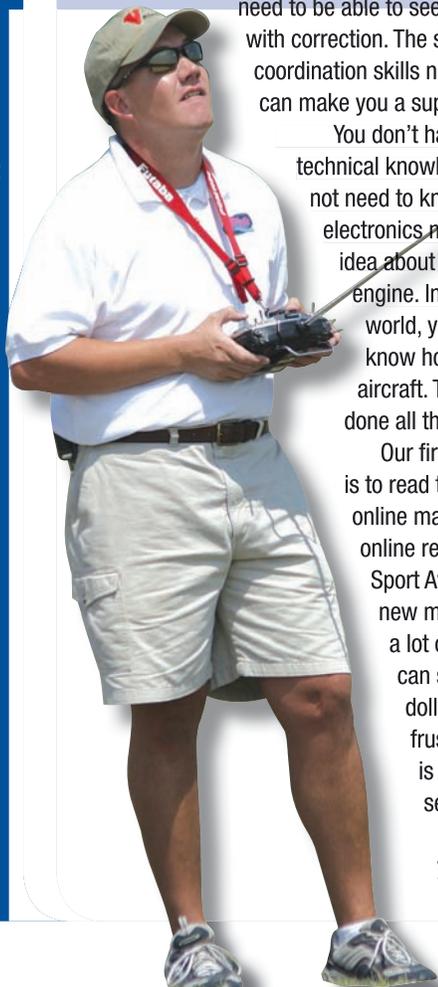
Once at the field, just observe for a few minutes. Look for a pilot with a 5- to 6-foot-wingspan aircraft with the wing on the top, who is flying without help from anyone. This will be a recently graduated student pilot. Say hello, and gain from that person how the learning process went.

Each club is different, but RC instruction as a member of an AMA RC club is almost always without charge. Like you, instructors are enjoying their sport. Always resist the temptation to fly by yourself before you have learned enough to do so safely.

At this point you're probably thinking, "How long does it take to acquire the basic skills needed to solo safely?" The short answer is anywhere from two weeks to two months; it depends a lot on the student.

One of the greatest tools for learning RC flying is the computer flight simulator. There are now many great RC simulators available that can reduce learning time to as little as two to three weeks. Simulators help build eye/hand coordination. They also allow the student pilot to fly more often since it is usually impossible to get to the flying field every day. See your hobby dealer for more information.

Again, beyond any recommendations we've offered here, your best advice on what to buy and how to use it will be available through local hobby shops and model airplane clubs. Every person will have certain likes and dislikes about beginners' equipment. Local availability of products and repair services will play an important part in making the right choice for you. A good hobby dealer or AMA club will be happy to share its knowledge and help you succeed.



WHAT IS AMA?

- AMA is the Academy of Model Aeronautics.
- AMA is the world's largest model aviation organization, representing a membership of more than 150,000 from every walk of life, income level, and age group.
- AMA is a self-supporting, non-profit organization whose purpose is to promote development of model aviation as a recognized sport and worthwhile recreational activity.
- AMA is an organization open to anyone interested in model aviation.
- AMA is the official national body for model aviation in the United States. AMA sanctions more than a thousand model competitions throughout the country each year, and certifies official model flying records on a national and international level.
- AMA is the organizer of the annual National Aeromodeling Championships, the world's largest model airplane competition.
- AMA is the chartering organization for more than 2,400 model airplane clubs across the country. AMA offers its chartered clubs official contest sanctions, insurance, and assistance in getting and keeping flying sites.
- AMA is the voice of its membership, providing liaison with the Federal Aviation Administration, the Federal Communications Commission, and other government agencies through our national headquarters in Muncie, Indiana. AMA also works with local governments, zoning boards, and parks departments to promote the interests of local chartered clubs.
- AMA is an associate member of the National Aeronautic Association. Through NAA, AMA is recognized by the Fédération Aéronautique Internationale (FAI), the world governing body of all aviation activity, as the only organization which may direct US participation in international aeromodeling activities.

For more detailed information, contact the Academy of Model Aeronautics, Marketing Department, 5161 E. Memorial Dr., Muncie IN 47302; Tel.: (765) 287-1256.

AMA VISION

We, the members of the Academy of Model Aeronautics, are the pathway to the future of aeromodeling and are committed to making modeling the foremost sport/hobby in the world.

This vision is accomplished through:

- Affiliation with its valued associates, the modeling industry and governments.
- A process of continuous improvement.
- A commitment to leadership, quality, education and scientific/technical development.
- A safe, secure, enjoyable modeling environment.

AMA MISSION

The Academy of Model Aeronautics is a world-class association of modelers organized for the purpose of promotion, development, education, advancement, and safeguarding of modeling activities. The Academy provides leadership, organization, competition, communication, protection, representation, recognition, education and scientific/technical development to modelers.

> Find Everything You Need To Know –

for Free!

Millions of people around the world are enjoying the sport of model aviation. Millions more want to join them but need more details about how, where, costs, and required skills. *Model Aviation's Sport Aviator* online magazine meets the needs of everyone interested in flying model aircraft.

Sport Aviator has all the details, all the information, and everything you need to get started in the best way possible. Modern RTF aircraft can be assembled in 30 minutes by anyone; no special skills are needed. Sport Aviator's articles and videos are your best guide next to having an instructor at your side.

MODEL AVIATION'S
Sport Aviator
The e-zine for the new model pilot.

www.masportaviator.com



Sport Aviator's Sure-Start Guide features videos and short articles on getting started. Watch an actual flight lesson, find out about all the training and sport aircraft available today, and then watch them fly. Before you go shopping, learn about RC aircraft that cost only \$30 and about those that cost \$400.

WHAT IS THE PARK PILOT PROGRAM?

The AMA, in response to the growing number of pilots taking advantage of the breakthroughs in RC electrics, created a membership category specifically for park flyer type aircraft. A Park Pilot Program member receives a magazine, insurance, and access to events tailored to the type of aircraft that he/she enjoys.

WHAT IS A PARK FLYER?

The AMA currently defines a park flyer as a model weighing less than 2 pounds and incapable of reaching speeds greater than 60 mph. It must use electric propulsion, be remotely controlled or flown with a control line, and remain within the pilot's line of sight at all times.

WHAT DO YOU GET?

For \$29.95, your annual membership includes:

- Park Pilot quarterly magazine
- Access to the Park Pilot Web site
- Park Pilot Partner network to help you get started
- Coupons and rebates on popular electric-flight merchandise
- \$500,000 personal liability insurance coverage

In addition, \$2.5 million liability coverage is available for owners of AMA-designated Park Flying Sites.

WWW.THEPARKPILOT.ORG





USEFUL TERMS FROM A TO Z

Aerofoil: A cross-section of the wing taken at right angles to the span of the wing.

Aileron: The hinged outer control surface on the wing that provides roll control.

Airfoil: The shape of the wing that contributes to the lift capability of the aircraft.

Altitude: Height above a reference point.

Angle of attack: The angle difference between the wing-chord line and the relative wind.

Balsa: Very light but very strong wood.

Biplane: An aircraft with two main flying wings.

Buddy box: A second transmitter that permits the instructor to pass control to the student.

Bulkhead: A vertical former inside a fuselage.

Canard: The flight control surfaces mounted at the front of an aircraft.

Canopy: The movable cover over the cockpit.

Castor oil: Viscous oil mixed with the fuel, to cool and lubricate an engine.

Cement: An adhesive such as epoxy, Titebond, or Super Glue.

Center of gravity: The balance point of a model airplane.

Control Line: A model controlled by at least two long wires connected to a handle.

Control linkage: Any linkage transmitting servo movement to a control surface.

Delta: An aircraft with a triangular-shape wing.

Density: Mass per unit volume – a term used to describe the condition of the air.

Dethermalizer: An FF model device that prevents a loss or “fly-away.”

Dihedral: The upward sweep angle of the wing panels; it provides stability.

Drag: A combination of aerodynamic forces that tends to reduce speed.

Elevator: The hinged surface on the tailplane that provides control in pitch.

Empennage: The term used to describe the tail portion of an aircraft.

Engine: A mechanical device that converts energy into motion.

Fail-safe: A flight condition program that automatically engages in the event of frequency interference or a lost radio signal.

Fin: The fixed vertical portion of the empennage that holds the rudder.

Flare: A gradual increase in pitch angle to bleed off excess airspeed just before landing.

Flap: A part of the wing trailing edge hinged to adjust the lift and drag of the wing.

Flybar: Stabilizes the main rotor disk of a helicopter.

Four-stroke: A combustion system whereby the engine fires every other revolution.

Free Flight: Models flown with no remote-control system.

Fuel tank: A tank containing the fuel supply for an aero-engine.

Fuselage: The main body of the airplane.

Gas engine: An internal-combustion device that uses a spark-ignition system to ignite petroleum fuel.

Glow engine: An internal-combustion device that uses a glow plug to ignite methanol fuel.

Glow fuel: Methanol mixed with lubricating oil and various ignition additives.

Glow plug: A device that ignites methanol by catalytic action.

Hand launch: The airplane is released from the hand.

Horizontal stabilizer: The small lifting surface located behind the main lifting surfaces.

Indoor model: Model aircraft that weighs less than 16 ounces.

Joystick: The control lever or levers found on the transmitter of an RC model aircraft.

Keeper: A clamp device that maintains a reliable connection to a part of the aircraft.

Landing gear: The wheels of an airplane used during ground maneuvering.

Landing skid: The structural landing support of a helicopter, glider, or gearless aircraft.

Lateral stabilizer: Typically referred to as the “wing” of an aircraft.

Lift: The aerodynamic force generated by air flowing around an airfoil that is equal to or greater than the weight of the aircraft and acts opposite to the force of gravity.

Main rotor: A large rotor in the horizontal plane of a helicopter that provides the lift.

Moment: Refers to a distance on a model forward or aft of the balance point.

Monoplane: An aircraft with one main flying wing.

Muffler: A device attached to the engine outlet to reduce exhaust noise.

Nitro: Nitromethane is a fuel additive that increases a model engine's performance.

One-point landing (or a figure 9): Synonymous with “crash.” Something we hope never happens.

Park flyer: A small electric-powered model that weighs less than 32 ounces and is flown slower than 60 mph.

Plywood: A wood laminate that has a high degree of strength.

Power plant: An internal-combustion engine or electric motor.

Propeller: A device which transmits power by converting rotational motion into thrust.

Pushrod: A rigid connector between the control device and the hinged control surface.

Receiver: The electronic component of a radio system that receives the electromagnetic signal from the transmitter and delivers it to its servos.



Rib: The internal, vertical portion of the wing that gives it an airfoil-shaped contour.

Rudder: The vertical hinged control surface that provides control in yaw.

Sailplane: High-performance form of glider.

Scale model: Accurate reproduction of full-scale prototype.

Servo: The electromechanical device that moves the controls of the model according to commands from the receiver.

Spark plug: The electrical device of a gasoline engine used to control combustion.

Stabilizer: A flying surface that provides stability for an aircraft in flight.

Stall: The point at which the wing experiences a loss of lift; the aircraft will tend to drop abruptly.

Swashplate: The device that translates control inputs to the rotor head of a helicopter, for pitch and lateral control.

Tailboom: A horizontal portion of the helicopter that holds the tail surfaces and tail rotor.

Tail fins: The vertical part of an aircraft's tailplane for stability in the yaw axis.

Tailplane: Also known as horizontal stabilizer, a small lifting surface located behind the main wing.

Tail rotor: A small rotor at the tail of the helicopter to counteract the torque of the main rotor and provide yaw control.

Trailing edge: The aft-most edge of an airfoil or propeller.

Trim: The adjustment of a model's control surfaces to obtain a stable flight.

Two-stroke: A combustion system whereby the engine fires on every revolution.

Transmitter: The handheld part of the radio system that sends the signal to the receiver.

Turbine: Pure reaction engine in miniature operation per full-scale.

Universal connector: The plug on the wire lead of a servo that is inserted into a receiver.

V-tail: Tail control with each half placed at a 45° angle to the fuselage.

Vertical stabilizer: The portion of the empennage that includes the fin and rudder.

Winch: Used to launch model sailplanes to a great height.

Wing: Also called the lateral stabilizer, it's the largest aerofoil of an aircraft.

Wing chord: The distance measured horizontally between the wing's LE and TE.

Yaw: The left or right movement of an aircraft's nose about its vertical axis.

Z-bend: Made from wire that's shaped like a "Z," it's the simplest way to connect to a control surface or servo.



GLOSSARY OF ABBREVIATIONS

AoA – angle of attack

AMA – Academy of Model Aeronautics

ARF – Almost Ready to Fly

BEC – Battery Eliminator Circuit

BOM – Builder of the Model

CA – cyanoacrylate such as Super Glue

CAD – computer-aided design

cc – cubic centimeter

CD – Contest Director or compact disc

CG – center of gravity

CL – Control Line

cm – centimeter

cu. in. – cubic inch

dB – decibel

DT – dethermalizer

DDM – digital multimeter

EPP – Expanded Polypropylene (foam)

ESC – Electronic Speed Control

FAA – Federal Aviation Administration

FAI – Fédération Aéronautique Internationale

FCC – Federal Communications Commission

FF – Free Flight

Heli – helicopter

Hp – horsepower

HQ – Headquarters

IFF – Indoor Free Flight

kg – kilogram

kHz – kilohertz

LCD – liquid crystal display

LE – leading edge

LED – light-emitting diode

Li-Poly – Lithium Polymer (battery)

LZ – landing zone

mA – milliamperes

MA – *Model Aviation* magazine

mAh – milliampere-hours

MHz – megahertz

mm – millimeter

NAA – National Aeronautic Association

Nats – AMA National Aeromodeling Championships

Ni-Cd – Nickel Cadmium (battery)

NiMH – Nickel Metal Hydride (battery)

OFF – Outdoor Free Flight

PC – printed circuit or personal computer

PCM – pulse code modulation

PPM – pulse position modulation

RC – Radio Control

RES – rudder, elevator, spoiler

rf – radio frequency

ROG – rise off ground

ROW – rise off water

rpm – revolutions per minute

RTF – Ready to Fly

SASE – self-addressed stamped envelope

SIG – Special Interest Group

TE – trailing edge

URL – universal resource locator

ALL the Answers Are in Here!

The Quick-Start Guide CD-ROM is easy to follow and answers all the questions most new modelers have.

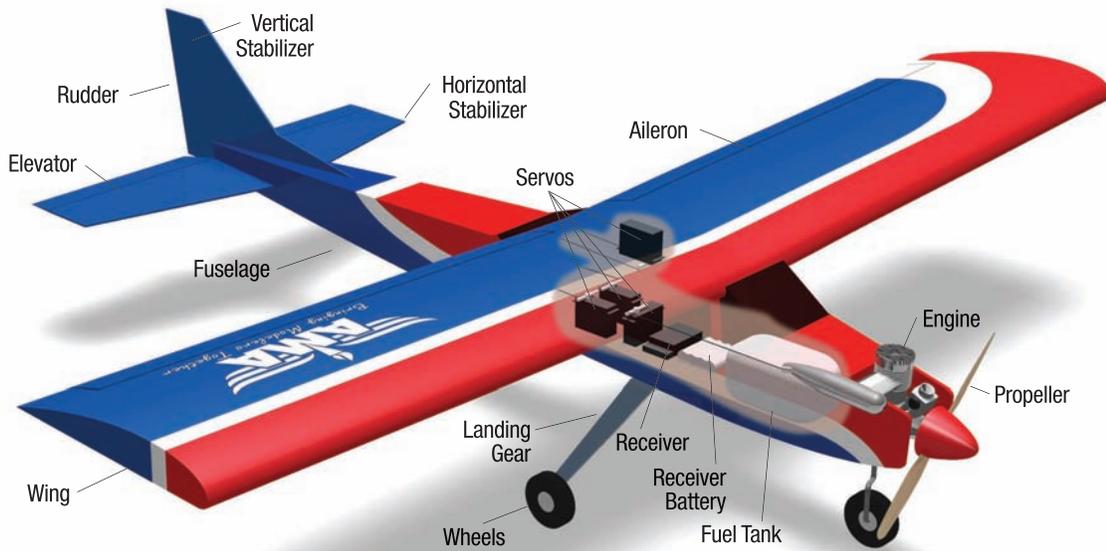


The guide is ideal for use as a handout at "try RC days," mall shows, and flying demonstrations. Get your copy by calling AMA Headquarters at (765) 287-1256, ext. 212. Check out the AMA Web site for updates on availability and other resource options at www.modelaircraft.org.

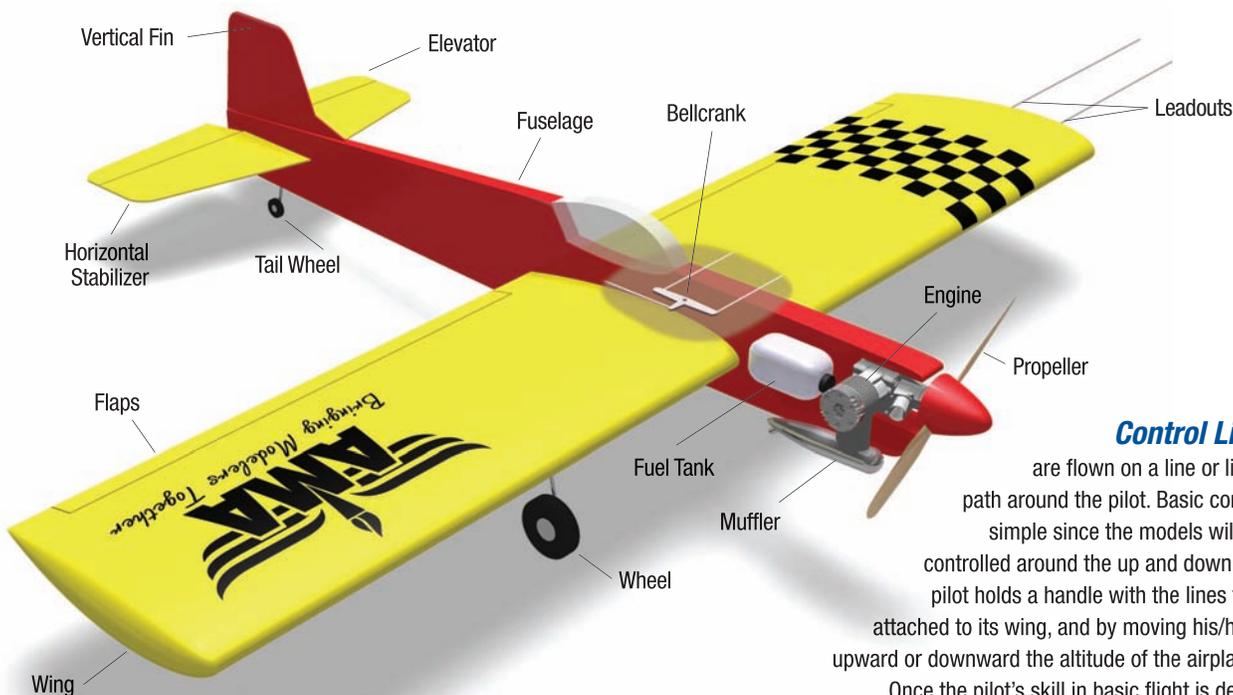
BASIC MODEL AIRCRAFT CATEGORIES

Radio Control (RC)

models are the most popular segment of the hobby/sport. They are guided by electronic equipment inside the aircraft that responds to signals the pilot sends from a handheld device called a transmitter. An RC airplane flies by the same principles of flight as a full-scale airplane, and may be built as complex to mimic every detail and function or much more simply with basic controls.



It is important to carefully choose where to fly these models, considering that people and property could be harmed in an accident. RC models range in size from 4-inch-wingspan aircraft that can be flown indoors to models weighing less than 2 pounds that can fly in a local park area, all the way up to 55-pound Scale models that have every exacting detail as the full-scale counterpart.



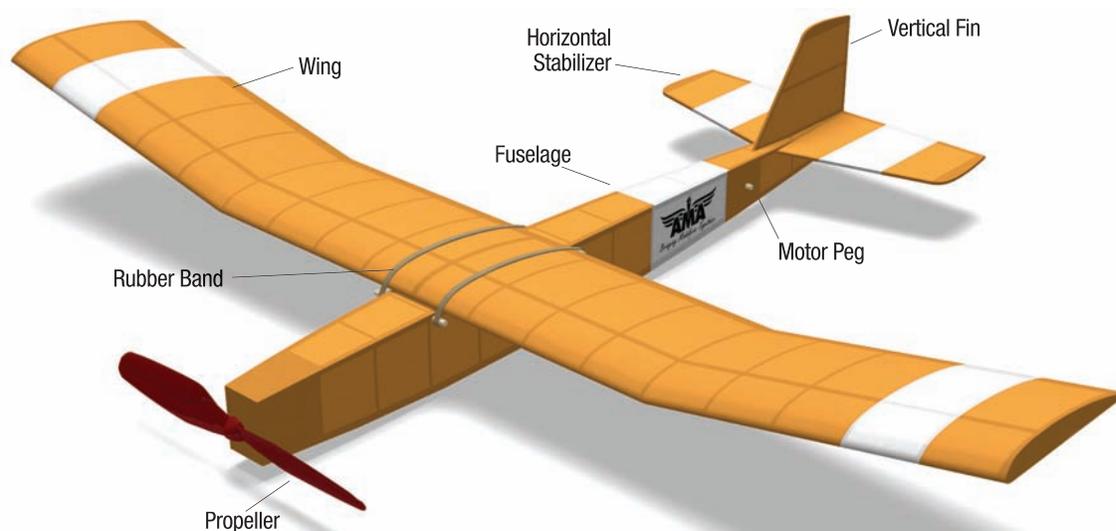
Control Line (CL)

models are flown on a line or lines in a circular path around the pilot. Basic control is relatively simple since the models will usually only be controlled around the up and down (pitch) axis. The pilot holds a handle with the lines from the aircraft attached to its wing, and by moving his/her hand or wrist upward or downward the altitude of the airplane is controlled. Once the pilot's skill in basic flight is developed, he/she can learn to perform many graceful maneuvers.

Model sizes range from 12 to more than 50 inches in wingspan and can be powered with either internal-combustion engines or electric motors. Large CL models tend to fly more accurately and fly in a relatively large circle with a 70-foot radius. The experience that's unique to CL is that the pilot can "feel" the aircraft because he or she is physically connected while it is airborne.

There are four primary categories of model aircraft, and within each category are several sub-types. Each one has something unique to offer the modeler in terms of skill development and personal satisfaction.

A beginner may start his or her journey into the hobby/sport of aeromodeling with any of these four aircraft types. Visit your local flying field and hobby shop for more information.

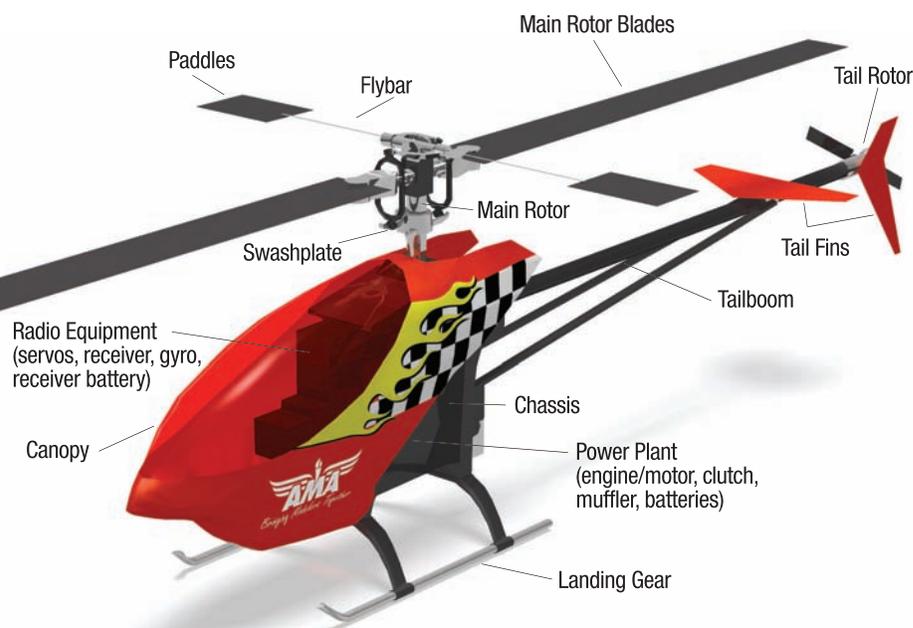


Free Flight (FF) models are flown with no piloted means of control. They can be powered by rubber-band motors, CO₂ motors, electric motors, internal-combustion engines, or no power plant at all. Once airborne, the FF model takes its direction from subtle angles built into the airframe during its construction. Usually these angles will cause the model to fly in a circular path to keep it from flying out of sight.

FF can be an inexpensive and fun way to learn the basic construction skills and flight characteristics of model aircraft. The models are typically very light, weighing 1 gram to 16 ounces. The lightest models fly best indoors, but a local park with very few trees is a great place to fly the larger models.

Helicopters are the most complex of all RC aircraft designs. They're referred to as rotor-wing aircraft because instead of a wing their main source of lift is the large spinning blades. Motors and internal-combustion engines are the resources for power on these RC aircraft, and they can range in size from 6 to 60 inches in rotor diameter.

It is possible today to successfully learn how to pilot an RC helicopter, even if the novice has no prior experience. Electric helicopters that have dual rotor heads are super-stable and are an excellent tool for conquering hover maneuvers. Forward flight and advanced helicopter maneuvers are better accomplished with single rotor-head helicopters.



INFORMATIONAL WEB SITES

As well as researching the abundant sources of print media available, you are encouraged to surf the Internet for other resources, commentary, and multimedia.

Academy of Model Aeronautics (AMA)

www.modelaircraft.org

Fédération Aéronautique Internationale (FAI)

www.fai.org

International Miniature Aircraft Association (IMAA)

www.fly-ima.org

International Miniature Aerobatic Club (IMAC)

www.mini-iac.com

International Radio Controlled Helicopter Association (IRCHA)

www.ircha.org

Jet Pilots' Organization (JPO)

www.jetpilots.org

League of Silent Flight (LSF)

www.silentflight.org

Miniature Aircraft Combat Association (MACA)

www.maca.hobby-site.com:3535

Model Engine Collectors Association (MECA)

www.modelenginecollectors.org

National Association of Scale Aeromodelers (NASA)

www.nasascale.org

National Competition Fun Fly Association (NCFFA)

www.ncffafunfly.org

National Control Line Racing Association (NCLRA)

www.nclra.org

National Electric Aircraft Council (NEAC)

www.electricalaircraft.org

National Free Flight Society (NFFS)

www.freeflight.org

National Miniature Pylon Racing Association (NMPRA)

www.nmpr.org

National Society of Radio Controlled Aerobatics (NSRCA)

<http://nsrca.us>

Park Pilot Program

www.theparkpilot.org

Precision Aerobatics Model Pilots Association (PAMPA)

www.control-line.org

RC Combat Association (RCCA)

www.rcccombat.com

Scale Warbird Racing Association (SWRA)

www.swraracing.com

Senior Pattern Association (SPA)

www.seniorpattern.com

Society of Antique Modelers (SAM)

www.antiquemodeler.org

Sport Aviator e-zine

www.masportaviator.com

Unlimited Scale Racing Association (USRA)

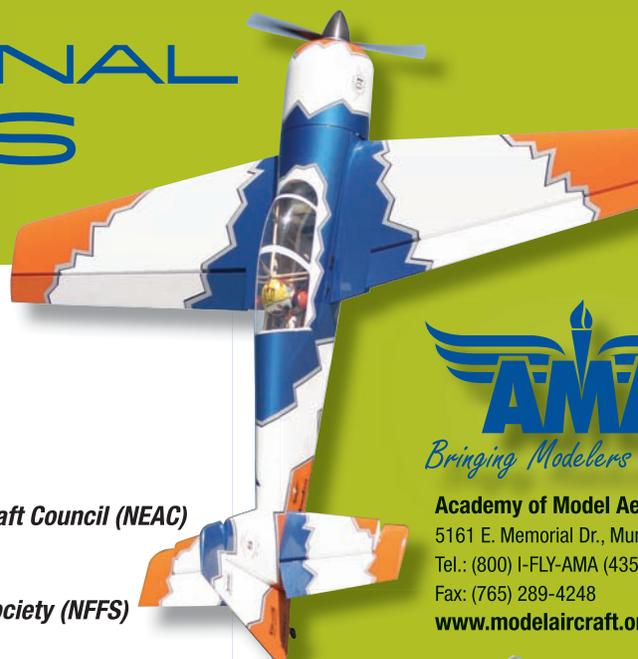
www.usrainfo.org

Vintage R/C Society (VR/CS)

www.vintagercsociety.org

World Miniature Warbird Association (WMWA)

www.wmwa.org



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